The Effectiveness of Dry Needling in Patients with Piriformis Syndrome

R.Swetha\textsuperscript{1}, N. Senthil Kumar\textsuperscript{2}, Kumaresan A\textsuperscript{3}, Pavithra\textsuperscript{4}, Anitha\textsuperscript{5}, Muthu Kumaran\textsuperscript{6}, Jagatheesan Alagesan\textsuperscript{7}

\textsuperscript{1}Undergraduate, \textsuperscript{2}Assistant Professor, \textsuperscript{3}Professor, \textsuperscript{4}Tutor, \textsuperscript{5}Assistant Professor, \textsuperscript{6}Professor, \textsuperscript{7}Professor, Saveetha College of Physiotherapy, Saveetha Institute of Medical and Technical sciences, Chennai, Tamil Nadu, India.

Abstract

Background: The research is on assessment of the effectiveness of dry needling in patients with piriformis syndrome. It is a non discogenic form of sciatica brought on by piriformis muscle impingement on the sciatic nerve. It can be responsible for 0.3% to 6.0% of all sciatica and low back pain cases. Post traumatic piriformis syndrome may occur in patients who experience lumbar nerve-root compression symptoms and signs after receiving a forceful injury to the buttock. Dry needling is a minimally invasive therapy by the insertion of tiny monofilament needles into muscles, ligaments, tendons without the use of injectable substances.

Purpose: To find the effectiveness of dry needling in patients with piriformis syndrome.

Materials and Methods: Total of 356 participants were taken according to the inclusion and exclusion criteria from new life phyio, shanthi physio and saravana ortho clinic. The participants were randomly allocated into two groups, dry needling with theraband exercise group and IFT with theraband exercise group. The group A=178 participants and group B=178 participants. All the subjects underwent pretest measurement with NPRS in the beginning of treatment. The study was quasi experimental study and the duration was about 4 weeks of June 2023.

Results: Statistical analysis of data showed significant differences not only in the dry needling group but also in the conventional group. The dry needling group was significantly higher than the IFT group, with a p value of <0.0001.

Conclusion: Dry needling is more effective than IFT in the piriformis syndrome.

Key Word: Dry needling, interferential therapy, exercise, theraband, pain.

Introduction

The flat, pear-shaped piriformis muscle is situated in the gluteal area of the hip and proximal thigh. The tendon of the piriformis muscle joins the tendons of the obturator internus and the inferior and superior gemellus before inserting on the femur. The muscle abuts the posterior wall of the pelvis and the posterior wall of the hip joint.\textsuperscript{1} PS is a non discogenic form of sciatica brought on by piriformis muscle impingement on the sciatic nerve. The literature

Corresponding Author: N. Senthil Kumar, Assistant Professor, Saveetha College Of Physiotherapy, Saveetha Institute of Medical & Technical Sciences, Chennai, Tamil Nadu, India.

E-Mail: senthilresearch1980@gmail.com
varies in its associations between PS and low back pain and buttocks pain. It can be responsible for 0.3% to 6.0% of all sciatica and low back pain cases. Scatica in the form of piriformis syndrome is brought on by piriformis muscle compression of the sciatic nerve. Due to the wide range of low back and buttock pain diagnoses and the overlapping symptoms of many of them, the diagnosis of piriformis syndrome is difficult to make. The piriformis condition is difficult to diagnose. Pace’s sign comprises of discomfort and weakness with resistant hip external rotation and abduction when the patient is seated. 46.5% of people with piriformis syndrome had a positive test result. Post traumatic piriformis syndrome may occur in patients who experience lumbar nerve-root compression symptoms and signs after receiving a forceful injury to the buttock. The internal obturator muscle can be surgically released to Dry needling has been linked to a number of clinical benefits, but comprehensive research about its potential physiological mechanisms of action and effects is still missing. The pathophysiology of myofascial trigger points, including the taut band, local ischemia and hypoxia, peripheral and central sensitization. The sciatic nerve (or a portion of it) actually reaches the muscle in 7% to 21% of investigated populations.

Dry needling is a minimally invasive therapy method that is inexpensive, simple to learn with the right instruction, and carries a low risk. Numerous research and two thorough systematic reviews have supported its efficacy. It has been demonstrated that the deep method of dry needling is superior to the shallow one for treating pain brought on by myofascial trigger points. However, therapist advised employing the superficial method, which has also been demonstrated to be beneficial, albeit to a lower amount, over regions with a possible risk of serious side outcomes, such as the lungs and large blood vessels. To determine whether dry needling is successful, more research is required. Additionally, there is a critical need for more research on how myofascial pain develops.

A variety of neuro musculoskeletal pain syndromes can be treated by inserting dry needles close to peripheral nerves and/or neurovascular bundles. Various US State Boards of Physical Therapy have specifically classified dry needling as a “intramuscular” therapy involving the isolated treatment of “myofascial trigger points”. The methods used for acupuncture needling, also known as trigger point dry needling or intramuscular stimulation, vary among health professions.

**Aim**

To compare the effectiveness of dry needling in patients with piriformis syndrome

**Material and Method**

Total of 356 participants were selected according to inclusion and exclusion criteria and the participants were explained about treatment safely and simplicity of the procedure and written consent was obtained. Subjects willing to participate were randomly allocated into two groups. Group A=178 participants and group B=178 participants. Dry needling with theraband exercise group and IFT with exercise group. All the subjects underwent pretest measurement with NPRS in the beginning of treatment. The study procedure has been held at Shanthi physiotherapy clinic, New Life physiotherapy clinic, and Saravana ortho clinic.

**Inclusion Criteria:**
- Both men and women
- Age between 20-50
- NPRS Score between 5 to 10
- IT Workers
- Prolonged standing
- Recent hip surgeries
- Subjects who were tested positive FAIR test
- Subjects who were willing to participate in the study

**Exclusion Criteria:**
- Subjects with severe trauma
- Any congenital disorder of spine and lower limb
- Tumor
- Subjects who were not willing to participate in this study.
Outcome Measures:

Assessment was performed at baseline (before starting of treatment) and after two weeks of study.

- Numerical Pain Rating Scale

Procedure

Total of 356 subjects were included in the study based on inclusion and exclusion criteria. The study duration was 2 to 3 weeks. All the subjects were assessed using numerical pain rating scale. Group A was treated with dry needling technique along with theraband exercises for 20-30 minutes and group B was with interferential therapy along with theraband exercise for 20-30 minutes. Along with that piriiformis stretch was also performed for both the group A and B participants.

Numerical pain rating scale: A Respondent uses a whole number to indicate the severity of their discomfort when using the NPRS. A segmented numeric variant of the VAS. The most typical structure is a horizontal bar or line.

Conventional Group

This group received dry needling with theraband exercise and piriiformis stretch for the duration of 2-3 weeks. The procedure was concentrated on the obturator externus, piriiformis, gluteus minimus and superior gemellius muscle. The patient will be in a prone lying position and then the treatment will be given for 30 minutes. The needles will be inserted in the deep and superficial gluteal region with the informed consent to the patient and then the treatment will be started. The treatment will be given for continuous three days in a week for 30 minutes with the exercise prescribed.

Experimental Group

This group received interferential therapy with theraband exercise and piriiformis stretch. The modality was placed with the informed consent of the patient. The electrodes were placed on the gluteal surfaces and the therapy was given for 15 minutes. The theraband exercise and the piriiformis stretch was explained to the patient. During this process the patient were lying prone and the therapy was given. The protocol was clearly informed to the patient that they should not be do any other electrotherapy while participating in this treatment.

Exercise Regime:

Piriiformis Stretch:

Lift the knee and raise the affected leg. Reach across your body with the opposite hand, then slowly move the knee towards the shoulder on the other side. For 15 to 30 seconds, maintain the stretch.

Theraband Exercise:

1. Perform the bridge exercise. An elastic band is wrapped across your thighs. If you don’t have a circular band, loop your band by tying its ends together. Your feet should be hip distance apart while you lay on your back with your knees bent. Your thigh and buttock muscles should feel resistance from the elastic band, which should be tight. Hold your abdominal and buttock muscles tight during the movement. Without arching your back, raise your hips and back off the floor. Hold for five seconds, and then gradually reposition your spine on the floor. Do three sets in total of 20 repetitions.

2. Use a looped band to calmly perform a workout while lying on your side on the ground. Wrap your thighs in the elastic band. Keep your legs together, bend your knees, and contract your buttocks and abdominal muscles. Keep your ankles and feet together as you gradually elevate the knee of your top leg. Hold for five seconds before releasing. Replicate 10 to 20 times, then switch to the other side.

Data Analysis

Dry Needling Group

GRAPH 1- PRE AND POST TEST VALUES OF DRY NEEDLING
INTERPRETATION: Graph no.1 shows the pre and post mean values using NPRS and it shows extremely statistically significant.

**Interferential Therapy Group**

By using NPRS the post test value in the dry needling group was 2.58 while it was 5.20 in the IFT experimental group. This shows that the dry needling group was significantly higher than the IFT group with a p value of <0.0001. The final result of the study was that the dry needling is more effective than the interferential therapy.

**Discussion**

The purpose of this study was to find the effectiveness of dry needling in patients with piriformis syndrome.

The dry needling group consisted of 178 subjects who received dry needling in the piriformis muscle with theraband resistance exercise and consisted of 178 subjects who received Interferential therapy (IFT) on gluteal region with theraband exercise.

The outcome measures were Numerical pain rating scale. This study examined the effects of dry needling in patients with piriformis syndrome. The interventions lasted for two weeks and the 356 subjects of both men and women were taken and divided into two groups. 178 of them underwent a dry needling with theraband exercise and another 178 underwent interferential therapy with theraband exercises. Beneficial effect were significantly greater in dry needling than the IFT. When response were compared between both groups, the result showed a significant difference in dry needling technique than the IFT treatment. Statistical analysis of IFT modality by using numerical pain rating scale has a p value of 0.0001 which was considered statistically significant. This leads to the conclusion that the dry needling is statistically significant and advantageous than interferential therapy within a short period of time.

James Dunning et al stated that Targeting trigger points (TrPs) with in-and-out techniques like “pistoning” or “sparrow pecking” has been shown in several studies to improve pain and/or disability immediately or temporarily; however, because there are no high-quality, long-term trials that support the use of these techniques at exclusively muscular TrPs, the practise should be questioned. Myofascial pain syndrome literature supports the insertion of dry needles into asymptomatic body locations close to or far from the primary cause of pain.9

Result

The subjects were selected according to inclusion and exclusion criteria.
Leonid Kalichman, et al. demonstrated that the deep method of dry needling is superior to the superficial one for treating pain brought on by myofascial trigger points. However, we advise employing the superficial method, which has also been demonstrated to be beneficial, albeit to a lower extent, over areas with a possible risk of serious adverse outcomes, such as the lungs and large blood arteries. Additional research is required to assess the efficacy of dry needling. Manisha Uttam et al. demonstrated that a single session of dry needling, along with gentle stretching and a moist heat pack, was successful in releasing a myofascial trigger in a patient with acute Piriformis syndrome by lowering pain and increasing range of motion. Results for pain and hip joint ROM improved following the use of DN, gentle piriformis stretching, and a wet hot pack. Jonathan et al. stated that Patrick Stretching and physical therapy techniques have traditionally been the mainstays of PS treatment, with anesthetic and corticosteroid injections into the piriformis muscle origin, abdomen, muscular sheath, or sciatic nerve sheath also being given to resistant patients.

**Conclusion**

In conclusion, dry needling appears to be an effective treatment option for patients with piriformis syndrome. Several studies have investigated the effectiveness of dry needling in relieving pain and improving functional outcomes in patients with piriformis syndrome. These studies have consistently shown positive results, with a significant reduction in pain levels and improved mobility and function after dry needling interventions and disability scores after dry needling treatment. When compared to interferential therapy the dry needling with theraband is more effective within a short period of time.

**Ethical clearance:** The ISRB committee of a private hospital and institution in Chennai has provided its clearance for the conduct of human research that complies with all applicable national laws, institutional regulations. (Application Number 03/091/2022/ISRB/SR/SCPT).

**Funding:** This study is a self-funded study

**Conflict of Interest:** The authors state that there is no conflict of interest.

**References**